

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

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Paper No. 18

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte JURGEN KAADEN

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Appeal No. 1999-2705  
Application 08/686,756<sup>1</sup>

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ON BRIEF

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Before THOMAS, BARRETT, and GROSS, Administrative Patent Judges.

BARRETT, Administrative Patent Judge.

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<sup>1</sup> Application for patent filed July 25, 1996, entitled "Process for the Recording of Digital Signals on a Magnetic Tape in Multiple Longitudinal Tracks and Magnetic-Tape Recording Apparatus for Carrying Out the Process," which claims the foreign filing priority benefit under 35 U.S.C. § 119 of Federal Republic of Germany Application 195 35 089.8, filed September 21, 1995.

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#### DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the final rejection of claims 1-8 and 13-16.

We reverse.

#### BACKGROUND

The disclosed invention relates to a process and apparatus for recording digital signals on a magnetic tape using a plurality of recording heads arranged in a matrix, so that the magnetic tape is recorded in multiple longitudinal tracks. Recording heads arranged in a matrix are known.

To produce the optimum range of magnetic flux for maximum reproduction amplitude and negligible crosstalk, the operating point of the recording heads must be maintained very precisely. However, the magnetic flux in the gap of a recording head depends not only on the magnetizing current (which is the sum of a row current and column current) but also on the magnetic properties of the recording head itself. It is therefore difficult, if not impossible, to determine a single value of magnetizing current for which all of the recording heads have their operating points in an optimum range.

The invention solves this problem by measuring the magnetizing current required for operating each recording head at an optimum value. The value of the magnetizing current is stored in a nonvolatile memory separate from the magnetic tape. During the recording process, each recording head is supplied with a magnetizing current corresponding to the stored value of magnetizing current corresponding to that particular head, so that each head operates in an optimum range.

Claim 1 is reproduced below.

1. Process for the recording of digital signals on a magnetic tape in multiple longitudinal tracks by means of recording heads which are arranged in a matrix and are supplied with current row-wise and column-wise in dependence on the digital signals in a multiplex operation wherein the magnetic field resulting exclusively from row or column currents in the recording heads supplied with current in each case lies below the coercive field strength of the magnetic tape, while the magnetic field resulting from row and column currents superposed in the same sense in the respectively selected recording heads supplied with current lies above the coercive field strength of the magnetic tape and produces magnetized domains, wherein for each recording head a value determined in preliminary tests for the magnetizing current from row and column currents superposed in the same sense, for maintaining a desired operating point, is permanently stored in a non-volatile memory separate from the magnetic tape and, on selection, the recording heads are supplied with the stored values of the magnetizing current assigned to them.

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The Examiner relies on the following references:

1992	Lehureau	5,124,869	June 23,
1995	Masaki et al. (Masaki)	5,392,273	February 21,
2, 1995	Christner et al. (Christner)	5,412,518	May

Claims 1-8 and 13-16 stand rejected under 35 U.S.C.  
§ 103(a) as being unpatentable over Lehureau, Christner, and  
Masaki.

We refer to the final rejection (Paper No. 9) (pages  
referred to as "FR\_\_") and the examiner's answer (Paper  
No. 15) for a statement of the Examiner's position, and to the  
brief (Paper No. 14) and the reply brief (Paper No. 16) for a  
statement of Appellant's arguments thereagainst.

#### OPINION

##### Claims 1-8

The Examiner finds that Lehureau teaches the claimed  
process of claim 1 except (FR3):

Lehureau does not teach determining a current value in  
preliminary tests, permanently storing the current in a  
non-volatile memory separate from the tape, and on  
selection of the recording heads supplying the stored  
values. See col. 1 lines 40-55.

In other words, Lehureau does not teach anything about  
what Appellant claims to be his invention in the "wherein for

each recording head . . ." clause. Lehureau does not disclose or suggest compensating for the varying magnetic properties of the individual recording heads in a matrix recording head, such as typically occur in mass production. Thus, it is no surprise that Lehureau does not suggest the general solution of applying an individual magnetizing current for each individual recording head. Nor do we find this to be admitted prior art. Appellants note that the prior art solution to maintaining a precise operating point was to use arrangements of recording heads with largely identical magnetic properties (specification, p. 3).

The Examiner's position is as follows (FR3-4):

Christner et al teaches, in the art of magnetic storage media, storing a current value determined in preliminary tests in a non-volatile memory separate from the medium and on selection of the recording heads and [sic] supplying the stored current values. See the abstract.

Masaki et al teaches in the art of dynamic storage, permanently storing control values determined in preliminary tests in a non-volatile memory separate from the medium. See col. 13 lines 11-18, col. 14 lines 7-28 and col. 16 line 54 - col. 17 line 2.

Although, Christner et al and Masaki et al are related to disk storage mediums, it is well known in the art that disk recording techniques are also applicable to tape recording techniques. Furthermore, Lehureau et al implies that the recording systems would have been

applicable to disk devices in the description of the prior art in col. 1, lines 11-12.

It would have been obvious to one of ordinary skill in the art at the same time the invention was made to modify the teachings of Lehureau with Christner et al and Masaki et al, motivation being to provide optimized current for each head as set forth in the abstract and to provide optimum write conditions as set forth in col. 3 lines 61-65 of Masaki et al.

The rejection contains some factual errors which confuse the analysis. Christner teaches (abstract): "An optimized bias current for each head is ascertained and stored on the disk surface at the time of manufacture. During each power up operation the values are transferred to random access memory which is accessed during the execution of each head switch command to apply bias current in accordance with the optimized value to the active MR head." The bias values stored on the disk are not "separate from the magnetic [medium]," and the random access memory (RAM) is not a "nonvolatile memory." Thus, the Examiner errs in finding that Christner teaches storing a current value in a non-volatile memory separate from the magnetic medium.

The rejection does not state how it is proposed to modify Lehureau with the teachings of Christner and Masaki other than by somehow incorporating the features discussed. Interpreting

the rejection and references in the light most favorable to the Examiner, we presume that the Examiner proposes that it would have been obvious (1) to store and apply individual magnetizing current values to the recording heads in Lehureau in view of Christner and Masaki, and (2) to store values in a nonvolatile memory as taught by Masaki instead of storing values on a disk and transferring them to a RAM upon startup as in Christner.

We find no motivation in Christner or Masaki to modify Lehureau to store and recall individual magnetizing current values. Christner teaches adaptively controlling the biasing of a magneto resistive read head in a magnetic disk drive and, thus, Christner does not show or suggest any process for adjusting write currents in write heads. The Examiner offers no explanation of why bias currents in the read heads of Christner would have motivated one of ordinary skill in the art to modify write currents in write heads of the matrix recording head in Lehureau. Because Christner does not deal with adjusting write currents in write heads, the only apparent explanation for the modification of Lehureau in view of Christner is hindsight in view of Appellant's disclosure.

Masaki is directed to a control method and controller for an optical storage drive including an optical head arrangement for applying light to an optical storage medium and for receiving reflected light from the optical storage medium. The values stored in the nonvolatile memory are drive current values with which the laser light source provides a predetermined light power value (abstract). Because Masaki does not deal with adjusting write currents in write heads, the only apparent explanation for the modification of Lehureau in view of Masaki is hindsight in view of Appellant's disclosure.

In summary, we find no motivation for modifying Lehureau to produce the claimed invention. Lehureau does not disclose or suggest compensating for the varying magnetic properties of the individual recording heads in a matrix recording head, much less suggest the general solution of determining an individual magnetizing current for each individual recording head. This suggestion must come from the prior art or from the knowledge of one of ordinary skill in the art. Neither Christner nor Masaki is directed to the problem of compensating for the varying magnetic properties of the

individual magnetic write heads in a matrix recording head. The Examiner's reliance on Christner and Masaki being in the general field of disk storage mediums does not provide motivation for the specific modifications needed and, moreover, it ignores the fundamental differences between the optical recording in Masaki and the magnetic recording in the present invention. We conclude that the Examiner has improperly implied hindsight in making the rejection and has failed to establish a prima facie case of obviousness as to claim 1. The rejection of claim 1 and its dependent claims 2-8 is reversed.

Claims 13-16

The Examiner finds that Lehureau teaches the claimed apparatus of claim 13 except (FR5): "Lehureau does not teach a control unit, a controllable current source, and a non-volatile memory." In addition, Lehureau does not teach a common controller circuit. In other words, Lehureau teaches a matrix-type recording head but does not otherwise teach anything about Appellant's invention.

Claim 13 contains apparatus limitations corresponding to the method of claim 1 and is more detailed. The Examiner's

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reasoning is essentially the same. For the reasons stated in the analysis of claim 1, we conclude that the Examiner has failed to establish a prima facie case of obviousness as to claim 13. The rejection of claims 13 and its dependent claims 14-16 is reversed.

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CONCLUSION

The rejection of claims 1-8 and 13-16 is reversed.

REVERSED

JAMES D. THOMAS	)	
Administrative Patent Judge	)	
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	)	
	)	
	)	BOARD OF PATENT
LEE E. BARRETT	)	APPEALS
Administrative Patent Judge	)	AND
	)	INTERFERENCES
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ANITA PELLMAN GROSS	)	
Administrative Patent Judge	)	

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